## REMARKS

Reconsideration and continued examination of the above-identified application are respectfully requested.

The undersigned and the representatives of the assignee as well as one of the inventors appreciate the interview held with Examiners Oltmans and King on September 11, 2002. The comments set forth below include the substance of the interview. Furthermore, the undersigned greatly appreciates the flexibility of the Examiners in accommodating the schedules of the various persons attending the interview on behalf of the assignee, Cabot Corporation.

With respect to the amendments, full support for these amendments can be found throughout the present application, including, but not limited to, pages 8 and 13-16 and the claims as originally filed. Accordingly, no questions of new matter should arise and entry of this amendment is respectfully requested.

Furthermore, as discussed during the interview, also submitted with this response is a Supplemental Information Disclosure Statement. The undersigned and the applicants have addressed each of the references submitted by way of this Information Disclosure Statement in order to assist the Examiner in showing the differences between this cited art and the claimed invention.

At page 2 of the Office Action, the Examiner indicates that if claim 65 is found allowable, claim 82 will be objected to since claim 82 contains the same subject matter. The applicants appreciate the Examiner's comments and have now cancelled claim 82 by way of this amendment. Accordingly, this objection should be withdrawn.

At the bottom of page 2 of the Office Action, the Examiner rejects claims 1-18, 22-43, 63-66, 78-94, 96-116, and 118-119 under 35 U.S.C. §103(a) as being unpatentable over Douglass et al. (U.S. Patent No. 3,497,402). The Examiner asserts that Douglass et al. shows a method of producing a cold worked annealed tantalum alloy containing tantalum and 10-1000 ppm of yttrium. The Examiner asserts that Douglass et al. shows that the tantalum is forged, annealed, rolled, and then annealed, and that complete recrystallization occurs and the ASTM grain size appears to overlap the grain size of the present invention. The Examiner does admit that Douglass et al. fails to teach the exact compositional or grain size ranges, the center peak intensity, or the use of this material in a sputtering target or resistive film layer. However, the Examiner still concludes that one of ordinary skill in the art would have considered the invention obvious because the alloy in Douglass et al. has the same composition of

the present invention.

Furthermore, with respect to the claims relating to a sputtering target and resistive film layer, the Examiner asserts that these limitations have not been given patentable weight because the recitation occurs in the preamble. For the following reasons, this rejection is respectfully traversed.

The present invention relates to tantalum metal that is characterized by at least one of three properties and preferably by two or more properties and more preferably by all three properties. These properties are the purity level of the tantalum metal, the average grain size of the tantalum metal, and the texture of the tantalum metal.

With respect to Douglass et al., as explained during the interview, Douglass et al. relates to a tantalum alloy. As described in Douglass et al., which has a filing date of 1966, a tantalum alloy is prepared by arc melting of tantalum with the addition of yttrium in order to achieve a yttrium level of from 10 to 1,000 ppm yttrium. Douglass et al. makes no reference to the purity level of the tantalum used to form the alloy. As explained in the interview, the reference to "pure tantalum" in Douglass et al. is not a reference to tantalum having a 100% purity level of tantalum with no impurities, since such a purity level is not known to exist even today. Thus, the reference to "pure tantalum" in Douglass et al. must mean tantalum having a certain level of impurities.

To assist the Examiner, several references are attached by way of a Declaration submitted under 37 C.F.R. §1.132 by Christopher Michaluk. In the Declaration, the Examiner will see that Mr. Michaluk, who has a technical degree and experience in metallurgy, explains that the type of purity levels of tantalum in the time frame of Douglass et al. was approximately 99.95% to 99.985% which is significantly below the purity level recited in many of the claims of the present application including claim 1. By way of this Declaration and the cited references from the time period of the Douglass et al. invention, the applicants have provided clear evidence of the type of impurity levels that existed with tantalum in the 1960s. In fact, the one reference from Kirkbide et al., of 1965, clearly relates to a product that is within the tantalum alloy referenced in Douglass et al. As explained by Mr. Michaluk, the impurity levels of the tantalum containing the yttrium was approximately 99.98% pure. In Mr. Michaluk's Declaration, Mr. Michaluk clearly explains how this number is obtained and further shows other published documents from the same time frame clearly indicating the type of purities that were present in the tantalum at that time frame. Thus, it is clear that Douglass et al. does not teach or suggest the type of purity levels recited in many of the claims of the present application which is at least

about 99.995% pure tantalum metal. As indicated in the interview, should the Examiner believe that other purity levels were available at this time, the burden is now on the Examiner to show evidence of these other impurities. In the absence of such evidence, this rejection cannot be maintained and should be withdrawn.

Furthermore, as explained during the interview, Douglass et al. does not teach or suggest tantalum metal having a primary (111) texture throughout the thickness of the tantalum alloy. As explained by Mr. Michaluk in his Declaration, Douglass et al. uses anneal temperatures on the order of at least 3000° F for approximately 1 hour. In addition, the tantalum alloy is rolled to a sheet having a very small thickness preferably on the order of .020 inch thick. As explained by Mr. Michaluk, these high anneal temperatures in combination with the anneal time would lead to a texture that would essentially be a primary (100) texture which is very different from a primary (111) texture throughout the thickness of the metal. Accordingly, Douglass et al. does not teach or suggest a primary (111) texture throughout the tantalum metal as recited in some of the claims of the present application.

Finally, Douglass et al. does not teach or suggest sputtering targets at all or sputtered films or resistive film layers or capacitors cans that contain the tantalum metal of the present application. While the Examiner asserts that these specific articles are only in the preamble and entitled to no weight, the applicants respectfully disagree. The Examiner's attention is directed to M.P.E.P. § 2111.02 entitled "Weight of Preamble." As mentioned in this section, if the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is necessary to give life, meaning, and vitality to the claim then the claim preamble should be construed as if in the balance of the claim. Clearly, a sputtering target has a meaning to one skilled in the art and would be quite different from a claim which merely recites "tantalum metal." This would also be true for the other particular articles mentioned in the claims, such as a capacitor can or resistive film layer. In addition, the U.S. Patent & Trademark Office, as reflected for instance in one of the references cited by the Examiner, namely U.S. Patent No. 6,348,139, has recognized the term "sputtering target" in the preamble and has considered this relative to the meaning of the claim. Thus, for these reasons, Douglass et al. does not teach or suggest a sputtering target or the other articles mentioned in the claims.

For all of these reasons, Douglass et al. does not teach or suggest the claimed invention and this rejection should be withdrawn.

At page 4 and 5 of the Office Action, the Examiner rejects claims 19-21, 95, and 117 under 35 U.S.C. § 103(a) as being unpatentable over Douglass et al. in view of applicant's admitted known prior art. The Examiner relies on Douglass et al. in the same manner as discussed above in the earlier rejection. The Examiner then asserts that applicants admit that it is desirable to use tantalum metals in capacitor cans. For the following reasons, this rejection is respectfully traversed.

For the reasons set forth above in the earlier § 103 rejection in view of Douglass et al., these claims would also be patentable over Douglass et al. In addition, as was explained to Examiner King in an earlier telephone conversation, the applicants have not made any admission that the statement at page 3 of the specification is "prior art." Certainly, if capacitor cans have been known and contain tantalum metal as described in the claims of the present application, the Examiner should find a published article or other form of prior art to show this point. Accordingly, for the reasons set forth above, this rejection should be withdrawn.

At page 5 of the Office Action, the Examiner rejects claims 1-18, 22-43, 63-66, 78-94, 96-116, 118, and 119 under 35 U.S.C. § 103(a) as being unpatentable over Shah et al.(U.S. Patent No. 6,348,139). The Examiner asserts that Shah et al. shows tantalum metal and tantalum metal sputtering targets having impurity levels and grain sizes that overlap the impurity levels and grain sizes set forth in the present application. For the following reasons, this rejection is respectfully traversed.

To begin with, Shah et al. has a filing date of June 17, 1998 while the present application benefits from an earlier filing date of November 25, 1998 by way of § 120. Each of the claims set forth in the present application are clearly supported in the parent application since the present application is a continuation application of the parent application. Since Shah et al. has a filing date of June 17, 1998, Shah et al. is prior art under 35 U.S.C. § 102(e)/103. Submitted with this response is a Declaration under 37 C.F.R. § 1.131 wherein one of the inventors, Mr. Michaluk, clearly indicates that the conception of the present application and work on the claimed invention begun prior to June 17, 1998. Evidence showing this point is attached to the Declaration under 37 C.F.R. § 1.131. Accordingly, Shah et al. is not prior art with respect to the claimed invention. For this reason alone, the rejection in view of Shah et al. should be withdrawn.

Furthermore, as explained during the interview, Shah et al. relates to a tantalum article with a crystallized grain size and a uniform (100) texture. The uniform (100) texture is completely different from a primary (111) texture. In addition, if one would study the processing steps set forth in columns 5 and 6 of Shah et al., one can clearly see that the process used in Shah et al. is different from the preferred process used to make the primary (111) texture of the present application and this is explained in the attached Declaration submitted under 37 C.F.R. § 1.132 by Mr. Michaluk.

Furthermore, as explained during the interview, the only purity levels of tantalum shown in Shah et al. is a 99.95% tantalum product and no other purities above this are shown in Shah et al. at all. Thus, Shah et al. does not enable any higher purity levels of tantalum nor has any appreciation of working with high tantalum purity levels and yet achieving the desirable grain size and/or textures set forth in the claimed invention.

Furthermore, with respect to the Examiner's comments concerning the preamble language in some of the claims reciting a resistive film layer, the comments set forth above with respect to the weight of a preamble apply equally here. Accordingly, for the reasons set forth above, this rejection should be withdrawn.

At page 7 of the Office Action, the Examiner rejects claims 19-21, 95, and 117 under 35 U.S.C. § 103(a) as being unpatentable over Shah et al. in view of applicant's admitted known prior art. The Examiner, as in the previous rejection, asserts that it would be obvious to one of ordinary skill in the art to use the tantalum metal of Shah et al. to make capacitor cans because the applicant has admitted that it is desirable to use tantalum metals to make capacitor cans. For the following reasons, this rejection is respectfully traversed.

As stated above, the applicants have made no admission as to the state of the prior art. Second, the arguments set forth above with respect to Shah et al. apply equally here. Accordingly, the rejection should be withdrawn as well.

**Comparison of Claims with Information Set Forth in the Supplemental Information Disclosure Statement**

With respect to U.S. Patent No. 6,331,233, a copy of which was provided to Examiner King during the interview, this patent has a filing date of February 2, 2000, and therefore is not prior art to

the present application. However, the Examiner should pay particular attention to the claims of the '233 patent since some of these claims do recite a (111) texture.

U.S. Patent No. 6,348,113 to Michaluk et al., is the patent that issued from the parent application.

U.S. Patent No. 6,323,055 describes high purity tantalum and has a filing date of May 21, 1999. The undersigned notes that the '055 patent makes reference to a provisional application having a filing date of May 27, 1998. However, as the Examiner will see by the attached copy of the provisional application, many aspects of the '055 patent are not supported in the provisional application and therefore, the various descriptions found in the '055 patent only have the benefit of the filing date of May 21, 1999, which is after the § 120 filing date of the present application. In addition, the Declaration under 37 C.F.R. § 1.131 by Mr. Michaluk does show that the inventors of the present application conceived of the present application before May 27, 1998.

With respect to the copy of claims for the continuation applications relating to Shah et al., Rosenberg et al., and Turner et al., the comments set forth above apply equally to these claims.

With respect to the article entitled "The Effect of Yttrium on the Recrystallization in Grain Growth of Tantalum," the comments set forth above with respect to Douglass et al. apply equally to this reference. In other words, this reference does not show any texture or the purity levels set forth in the present application.

With respect to the copies of various definitions of alloys, this is for the convenience of the Examiner to better understand the difference between an alloy and a metal.

With respect to the National Research Corporation press release dated July 2, 1964, this press release shows the type of purity levels that existed with tantalum in 1964 and is explained in the Declaration of Mr. Michaluk.

With respect to the Cabot product information, for the Examiner's convenience, these sales or quotes have been identified with the letters A through D in order make easy reference to these documents. With respect to document A, this document shows a tantalum disc having a purity of approximately 99.996% tantalum and a grain size of ASTM 3.9 which is slightly greater than 90 microns nominal diameter. The date of this document is February 1996. With respect to the claims of the present application, this document does not show grain sizes on the order of 75 microns or less in combination with a purity level of at least 99.995%. As explained in the interview with the Examiners,

to achieve a combination of grain size, purity level, and/or texture level, many various competing interests must be properly balanced and the present invention achieves this for a very high purity tantalum. Document A does not show any texture and based on the annealing processes generally described in the document, it is believed that a texture of non-uniform mixed (100):(111) containing bands of primary (100) texture would have been produced.

Document B refers to a 99.98% tantalum material having a grain size ASTM of 8.8. Like Document A, no texture is mentioned in this document and based on the description of the material made, Mr. Michaluk believes to the best of his ability that the product would have had the same texture as document A above. In either case, this product would not have had a primary (111) uniform texture. In addition, the purity level of the tantalum is lower than 99.995% as recited in the many of the claims of the present application. The date of Document B is December 1996.

Document C relates to a fabrication of a tantalum sputtering target having a purity of approximately 99.99% tantalum. Low levels of niobium are reported in the Certificate of Compliance. Other than this point, the comments and differences set forth above with respect to Document B, apply equally here.

Finally, Document D relates to a quotation provided October 13 and 16, 1997. As shown on the October 16$^{th}$ quotation, this quotation was based on Cabot's ability to successfully make an ingot having the given purity. As set forth in the Declaration of Mr. Michaluk, when this quote was provided, no tantalum product was made and at this time, no grain size or texture were produced. Thus, at best, this quotation relates to a 99.999% pure tantalum product without any grain size or texture and is equivalent to Bernard (U.S. Patent No. 3,925,187) cited by the Examiner.

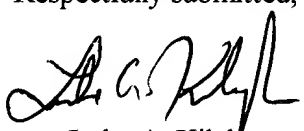
Accordingly, the documents set forth in the Supplemental Information Disclosure Statement do not teach or suggest the claimed invention.

## CONCLUSION

In view of the foregoing remarks, Applicants respectfully request the reconsideration of this application and the timely allowance of the pending claims.

If there are any other fees due in connection with the filing of this response, please charge the fees to deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,



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#7

Amendment
U.S. Patent Application No. 09/922,815

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

1. (Amended) Tantalum metal having a purity of at least about 99.995%, and an average grain size of about [125] 75 microns or less.

28. (Amended) A sputtering target comprising [Tantalum]tantalum metal in the shape of a sputtering target having a) an average grain size of about 50 microns or less[, or] and b) a texture in which [a (100) pole figure has a center peak intensity equal to or less than about 15 random or] [c)]a log ratio of (111):(100) center peak intensities of greater than about [–4.0] –2.0, [or combinations thereof] in the substantial absence of (100) textural bands.

29. (Amended) The [tantalum metal] sputtering target of claim 28 having an average grain size of from about 25 to about 50 microns.

30. (Amended) The [tantalum metal] sputtering target of claim 28 having a ratio of (111):(100) center peak intensities of greater than about [–4.0] 0.

32. (Amended) The sputtering target [tantalum metal] of claim 28, wherein said metal has purity of at least 99.995% tantalum.

33. (Amended) The sputtering target [tantalum metal] of claim 28, wherein said metal has a purity of 99.999% tantalum.

34. (Amended) The sputtering target [tantalum metal] of claim 28, wherein said metal is fully recrystallized.

35. (Amended) The sputtering target [tantalum metal] of claim 32, wherein said metal is fully recrystallized.

36. (Amended) The sputtering target [tantalum metal] of claim 33, wherein said metal is fully recrystallized.

37. (Amended) The sputtering target [tantalum metal] of claim 28, wherein about 80%

or more of said metal is fully recrystallized.

39. (Amended) The sputtering target [tantalum metal] of claim 28, wherein said log ratio is from about [–4.0] 0 to about 15.

66. (Amended) The tantalum metal of claim [65] 1, wherein the tantalum metal has an average grain size of from about 25 to about 75.

83. (Amended) Tantalum metal having a purity of at least about 99.995%, an average grain size of about 150 microns or less, and having [a) a texture in which a (100) pole figure has a center peak intensity less than about 15 random or b) a log ratio of (111):(100) center peak intensities of greater than about –4.0, or c) both] a uniform primary (111) texture through the thickness of the tantalum metal.

98. (Amended) Tantalum metal having an average grain size of about [125] 75 microns or less, and having 50 ppm or less metallic impurities.

105. (Amended) The tantalum metal of claim 98, where said average grain size is from about 25 to about [100] 75 microns.

111. (Amended) The tantalum metal of claim [98] 110, wherein said center peak intensity is from about 0 random to less than about 15 random.

112. (Amended) The tantalum metal of claim [98] 110, wherein said center peak intensity is from about 0 to about 10 random.

113. (Amended) The tantalum metal of claim [98] 110, wherein said log ratio is from greater than about [–5.0] 0 to about 15.

114. (Amended) The tantalum metal of claim [98] 110, wherein said log ratio is from about 11.5 to about 7.0.

115. (Amended) The tantalum metal of claim [98] 110, wherein said center peak intensity is from about 0 random to less than about 15 random, and said log ratio is from greater than about -4.0 to about 15.